

ROTATING REGULATING DEVICE

CLAIMS

1. Rotating regulating device (1) for the rotation and/or linear displacement of an actuating element (2) of a valve, throttle, blowout preventer or similar, in particular in the field of gas or oil production, with a spindle drive (3) and a drive train (4) rotationally driving the spindle drive, the said drive train exhibiting at least one reduction gear unit (5) and a drive device (6) connected to it for movement,
characterised in that
the rotating spindle (7) or nut (8) of the spindle drive (3) exhibits at least one engaging element (9, 10), essentially protruding radially outwards, which engages guide slots (11, 12, 13, 14), whereby a first guide slot (11, 13) is fixed relative to a device housing (15) and a second guide slot (12, 14) can be rotated relative to the device housing and/or is supported for displacement in the longitudinal direction of the rotating spindle (16), whereby the guide slots (11, 13, 12, 14) exhibit at least different slopes in the longitudinal direction of the rotating spindle and the movable guide slot (12, 14) is connected for movement to the actuating element (2).
2. Rotating regulating device according to Claim 1,
characterised in that
the guide slots (11, 13, 12, 14) are formed in a first fixed collar (17) which is fixed in the device housing (15), and a rotating collar (18) which is at least supported for rotation relative to the said fixed collar.
3. Rotating regulating device according to Claim 1 or 2,
characterised in that
the first and second guide slots (11, 13, 12, 14) are formed in opposing pairs relative to the rotating spindle (7).

4. Rotating regulating device according to one of the previous claims,
characterised in that
the rotating spindle (7) is supported so that it can be rotated, but is axially immovable, and the nut (8) can be displaced along the rotating spindle (7) and can be rotated relative to it.
5. Rotating regulating device according to one of the previous claims,
characterised in that
the rotating spindle (7) and nut (8) form a ball spindle drive (19).
6. Rotating regulating device according to one of the previous claims,
characterised in that
two engaging elements (9, 10), protruding radially outwards, are fastened to the nut (8), in particular releasably.
7. Rotating regulating device according to one of the previous claims,
characterised in that
the engaging elements (9, 10) are arranged spaced to one another in the circumferential direction (20) of the nut (8), in particular by 180°.
8. Rotating regulating device according to one of the previous claims,
characterised in that
the fixed collar (17) is fixed releasably to an inner wall (21) of the device housing (15).
9. Rotating regulating device according to one of the previous claims,
characterised in that
at least two mounting bolts (22) are fitted from the direction of the device housing (15) into the fixed collar (17) from a radial direction.
10. Rotating regulating device according to one of the previous claims,

characterised in that

the rotating collar (18) can be rotated at its ends (23, 24), but is supported so that it is axially immovable.

11. Rotating regulating device according to one of the previous claims,
characterised in that
the rotating collar (18) is rotationally rigidly connected at its end (23) facing the actuating element (2) to the said actuating element.
12. Rotating regulating device according to one of the previous claims,
characterised in that
the rotating collar (18) exhibits a ring-flange (25) on its front end (23), protruding radially inwards, on which the rotating spindle (7), in particular on a first end (26), is supported rotationally.
13. Rotating regulating device according to one of the previous claims,
characterised in that
the rotating spindle (7) is connected for movement by its second end (27) to the reduction gear unit (5).
14. Rotating regulating device according to one of the previous claims,
characterised in that
the reduction gear unit (5) is formed as a so-called harmonic drive (28).
15. Rotating regulating device according to one of the previous claims,
characterised in that
the flexible, cup-shaped sleeve (29) of the harmonic drive (28) is connected, in particular releasably, to the second end (27) of the rotating spindle (7).
16. Rotating regulating device according to one of the previous claims,
characterised in that

the wave generator (30) of the harmonic drive (28) is connected, in particular releasably, to a driven shaft (31) of the drive train (4).

17. Rotating regulating device according to one of the previous claims,
characterised in that
the driven shaft (31) is composed of different shaft segments (33, 34, 35, 36), arranged one behind the other.
18. Rotating regulating device according to one of the previous claims,
characterised in that
a shaft segment (34) is a spurwheel formed with an outer tooth arrangement (37).
19. Rotating regulating device according to one of the previous claims,
characterised in that
the spurwheel (34) is a worm wheel (40) engaging at least one worm (38, 39) via the outer tooth arrangement (37).
20. Rotating regulating device according to one of the previous claims,
characterised in that
the spurwheel (34) is a helically toothed spurwheel (43) engaging at least one helically toothed drive wheel (41, 42) via the outer tooth arrangement (37).
21. Rotating regulating device according to one of the previous claims,
characterised in that
the shaft segment (35) adjacent to the spurwheel (34) is supported rotationally inside the device housing (5) using pivot bearings (44, 45).
22. Rotating regulating device according to one of the previous claims,
characterised in that
a position sensor (46) is assigned to the shaft segment (36) terminating the driven shaft (31).

23. Rotating regulating device according to one of the previous claims,
characterised in that
the worm (38, 39) is essentially arranged centrally on a drive shaft (47, 48)
which is arranged perpendicular to the driven shaft (31).
24. Rotating regulating device according to one of the previous claims,
characterised in that
at least one motor (51, 52), in particular an electric motor, is assigned to both
ends (49, 50) of the drive shaft (47, 48).
25. Rotating regulating device according to one of the previous claims,
characterised in that
drive shafts (47, 48) are arranged in pairs opposite relative to the driven shaft
(31).
26. Rotating regulating device according to one of the previous claims,
characterised in that
the drive shaft (47, 48) is at least supported floating at one end.
27. Rotating regulating device according to one of the previous claims,
characterised in that
the drive shafts (47, 48, 53, 54) are mechanically synchronised in their
rotational movements using a mechanical coupling device (72) with toothed belt
(74), chain or similar.
28. Rotating regulating device according to one of the previous claims,
characterised in that
the drive shafts (47, 48, 53, 54) are electronically synchronised in their
rotational movement using the motors (51, 52, 56, 57).
29. Rotating regulating device according to one of the previous claims,

characterised in that

for a double helical gear (62) consisting of a helically toothed drive wheel (41, 42) and a helically toothed spurwheel (43), the drive shafts (53, 54) are arranged parallel to the driven shaft (31).

30. Rotating regulating device according to one of the previous claims,
characterised in that
with a double helical gear (62) at least two motors (56, 57) are assigned to an end (55) of the drive shaft (53, 54).
31. Rotating regulating device according to one of the previous claims,
characterised in that
a reduction gear unit (58), in particular a harmonic drive (59), is arranged between the motor (56, 57) and a helically toothed drive wheel (41, 42).
32. Rotating regulating device according to one of the previous claims,
characterised in that
the drive shaft (53, 54) is connected for movement to the flexible, cup-shaped sleeve (60) of the harmonic drive (59) and the helically toothed drive wheel (41, 42) is connected for movement to the wave generator (61).